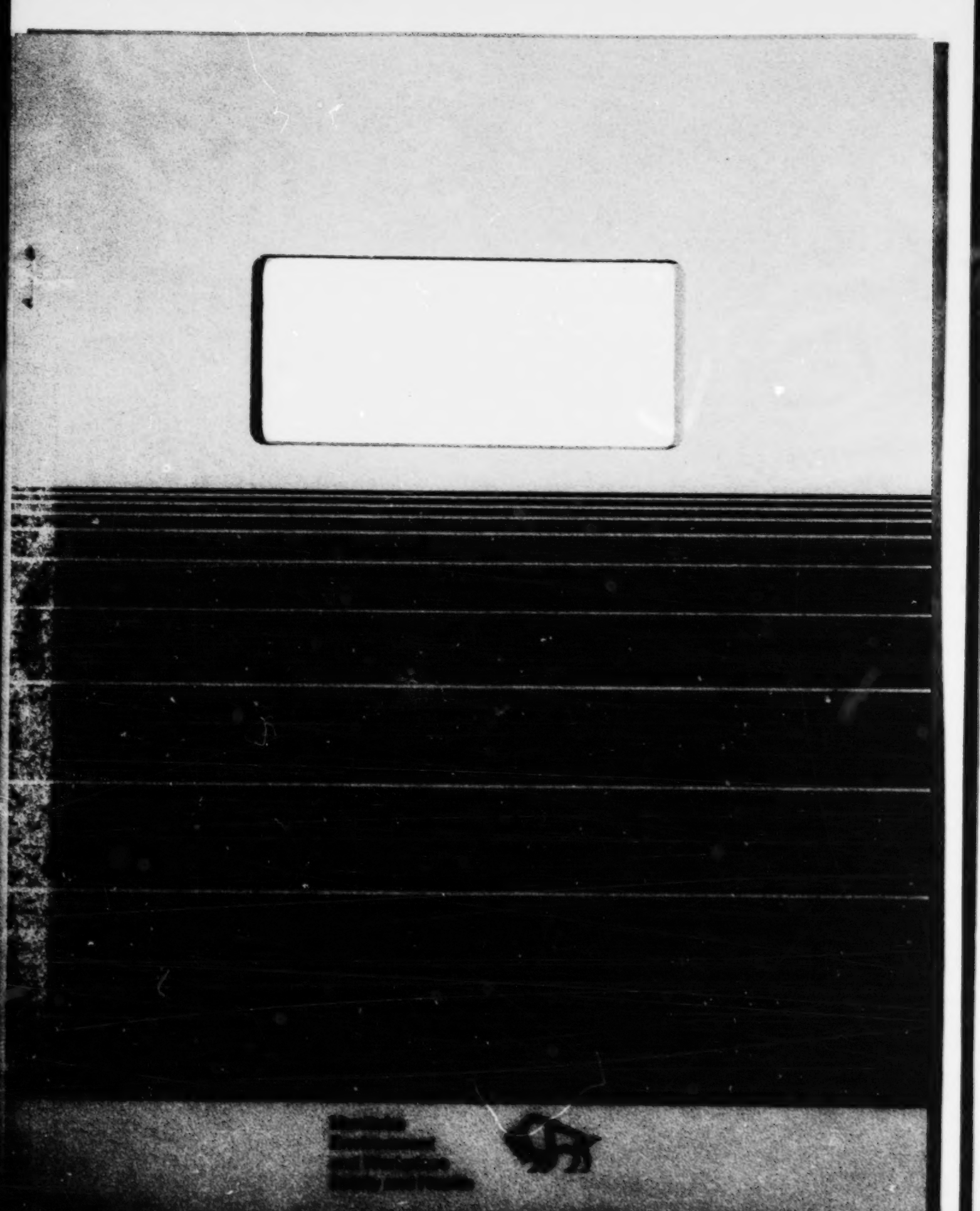

MANITOBA NETWORK FOR PRECIPITATION COLLECTION

- SUMMARY - 1983

by

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ABSTRACT

The Manitoba Network for Precipitation Collection program has monitored the quality of precipitation in Manitoba since 1980. This report presents data from this network (Island Lake and Norway House), for the period of January 1 to December 31, 1983. The mean weighted pH values for this period for Island Lake and Norway House were 5.06 and 5.16 respectively while the wet sulphate deposition was 7.66 and 8.18 respectively, expressed in kilograms/hectare/year. Fluctuations in these and other analytical parameters were evident when compared to similar data for the 1982 period.

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INTRODUCTION

The collection and monitoring of precipitation in Manitoba has been on going since the inception of the Manitoba Network for Precipitation Collection (M.N.P.C.) in the fall of 1980. This program has attempted to: 1) provide sufficient base data to determine the quality of precipitation with emphasis on acidic substances, and, 2) to offer verifiable precipitation chemistry data to other jurisdictions, and, 3) to determine any spatial or temporal trends in precipitation chemistry related to industrial activity and/or meteorological conditions within the boundaries of Manitoba.

This document presents data accumulated during the period of January 1 to December 31, 1983 from the two M.N.P.C. monitoring stations; Island Lake (lat. 53° 52'N., long. 94° 40'W.) and Norway House (lat. 54° 00'N., long. 97° 48'W). A broader overview of the M.N.P.C. network providing site descriptions, and programme procedures has been compiled under the title, "M.N.P.C. - An Overview", available from the Department of Environment and Workplace Safety and Health.

METHODOLOGY

This section provides a brief overview of the operational aspects of the M.N.P.C. program during the 1983 calendar year.

Sampler Operation

The precipitation collectors utilized during this report period were the Automated Sangamo type sampler. A sensing arm extending away from the instrument houses two sensor boards, which, in

the absence of precipitation, have open circuit. In this mode, the mechanical lid is closed over the "wet" collection bucket. At the onset of precipitation, any moisture striking the sensor board closes the circuit and through a series of gears, the lid traverses across the instrument, exposing the "wet" collection bucket to the precipitation. At the cessation of the precipitation, automatic heaters dry the sensor board and the cycle is reversed.

The sample was transfered to an acid washed 250 ml. polyethylene bottle and subsequently shipped to the Technical Services Laboratory in Winnipeg. Analytical parameters are; 1) pH, 2) acidity, 3) SO_4, 4) nitrate-nitrogen, 5) ammonium, 6) chloride, 7) calcium, 8) magnesium 9) sodium, 10) potassium. The order indicates priority.

Data was archived using a fourth generation computer language (Focus). Calculated yearly volume-weighted mean pH, SO_4, and NO_3 values and a yearly volume-weighted wet sulphate deposition constitute some of the data processing utilized. Details of field operating procedures are presented under "M.N.P.C. Field Manual", available from the Department of Environment and Workplace Safety and Health.

DISCUSSION AND RESULTS

A. Island Lake

During the report period (January 1 to December 31, 1983) the Atmospheric Environment Service weather station located on Stephenson Island, reported a total precipitation fall of 601.9 mm from 98 events. This translates to an expected or theoretical collection volume of 14.5 litres.

The M.N.P.C. monitoring instrument collected a total precipitation volume of 11.85 litres (calculated with collection vessel diameter of 175 mm) from 58 events for an overall collection efficiency of 82%. Of the total precipitation reported, 61.8% fell during the months of May to September, with September recording the highest total precipitation volume of 96 mm (15.9%) during the report period. The lowest reported total precipitation of 14.3 mm (2.4%) was in the month of February.

Of the 58 events collected by the M.N.P.C. instrument, 32 (55.2%) were rainfall, 18 (31.0%) were snowfall, and the remaining 8 (13.8%) were reported as either a combination of both or a different event type, such as hail or freezing drizzle.

Table 1.0 presents a summary of the data collected during the report period from the Island Lake monitoring station.

TABLE 1.0 SUMMARY OF DATA - M.N.P.C. - ISLAND LAKE - 1983

AES COUNT	MNPC COUNT	MIN. pH	MAX. pH	MEAN pH	TOTAL PRECIP. (cm)	AVE. SO_4 (mg/l)	AVG. NO_3 (mg/l)	WET SO_4 DEP.*	COL. EFF.
98	58	4.09	6.58	5.06	60.2	1.27	0.81	7.66	82.0

*reported in kg/ha/yr

Where:

AES count = number of precipitation events recorded during the report period.
MNPC count = number of samples collected by precipitation gauge.
MIN. pH = minimum pH recorded for report period.
MAX. pH = maximum pH. recorded for report period.
MEAN pH = volume-weighted mean pH.
TOTAL PRECIP. (cm) = total precipitation collected by A.E.S. instruments.
AVE. SO_4 = volume-weighted sulphate average.
AVE. NO_3 = volume-weighted nitrate average.
COL. EFF. = collection efficiency of MNPC collector expressed as a percentage of total precipitation.

The values presented in TABLE 1.0 indicate reductions in both the wet sulphate deposition and the average sulphate values when compared with similar parameters for 1982. The mean pH rose slightly during 1983. APPENDIX B presents a summary of the data from the program since inception. Appendix C presents the data on a daily basis. A graphic presentation of mean pH is located in Appendix D.

B. Norway House

During the report period, the Atmospheric Environment Service observing station, located at the airport, reported a total precipitation fall of 633.8 mm from 98 events. This translates to a theoretical collection volume of 15.2 litres. The M.N.P.C. monitoring instrument, located on an island approximately 16 km away, collected a total precipitation volume of 8.9 litres from 30 events for an overall collection efficiency of 58.6%. A three month void (Aug. - Oct.) caused by a mechanical breakdown contributed significantly to this lower efficiency. Of the total precipitation collected, 67.2% fell during the months of May to September with August recording the highest precipitation of 115.6 mm (18.2%). The lowest recorded precipitation fall was in April with a fall of 13.0 mm (2.1%). Of the 30 events collected, 11 (36.6%) were rain, 15 (50%) were snow and the remaining 4 (13.4%) were either a combination of both or another event type.

Table 2.0 summarizes the data collected during the report period.

TABLE 2.0 SUMMARY OF DATA - M.N.P.C. - NORWAY HOUSE - 1983

AES COUNT	MNPC COUNT	MIN. pH	MAX. pH	MEAN pH	TOTAL PRECIP. (cm)	AVE. SO_4 (mg/l)	AVG. NO_3 (mg/l)	WET SO_4 DEP.*	COL. EFF.
98	30	4.61	6.13	5.16	63.38	1.29	1.29	8.18	58.6

*reported in kg/ha/yr

Where:

AES count = number of precipitation events recorded during the report period.
MNPC count = number of samples collected by precipitation instrument.
MIN. pH = minimum pH recorded for report period.
MAX. pH = maximum pH recorded for report period.
MEAN pH = volume-weighted mean pH.
TOTAL PRECIP. (cm) = total precipitation collected by A.E.S. instruments.
AVE. SO_4 = volume-weighted sulphate average.
AVE. NO_3 = volume-weighted nitrate average.
COL. EFF. = collection efficiency of MNPC collector expressed as a percentage of total precipitation.

The data from TABLE 2.0 indicates an increase in the wet sulphate deposition and a slight decrease in both the average sulphate and nitrate values in comparison to 1982 data. The mean pH also increased (refer to APPENDIX B). Appendix C presents data on a daily basis. A graphic presentation of mean pH is located in Appendix D. For more information with respect to laboratory handling of samples, quality assurance and analytical procedures, the reader is referred to; FRITZ, D. L. Summary of Activities Relating to Laboratory Aspects of the Manitoba Network for Precipitation Collection in 1983, January 1984.

CONCLUSIONS

The following conclusions are based on the data collected during the 1983 report period and include;

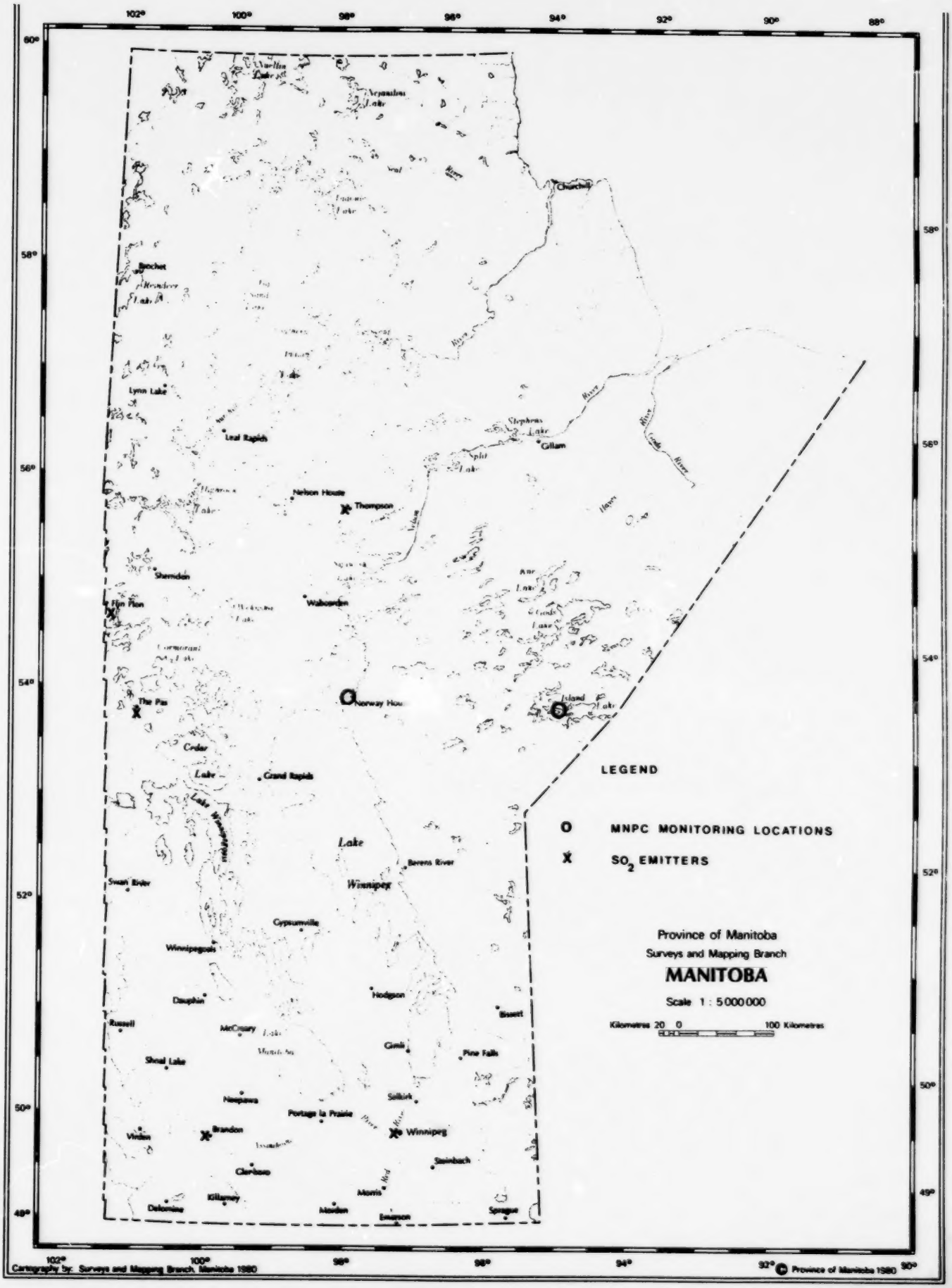
1) Wet sulphate deposition at Norway House and Island Lake averaged 8.18 and 7.66 kilograms per hectare per year, respectively. These levels represent both a slight increase and decrease from the previous year, respectively, but are still well below the 20 kg/hectare "effect level",

2) The weighted mean pH values increased moderately at both Norway House and Island Lake respectively in comparison to the previous year,

3) The ability to definitively determine the quality of precipitation in Manitoba is restricted in part to the close proximity of the two monitoring stations in relation to the spatial area of the Province and by the limited amount of data collected to date. Therefore, no conclusion on the quality of precipitation will be made based on the data presented in the 1983 year.

APPENDIX A

M.N.P.C. MONITORING LOCATIONS


102°
100°
98°
96°
94°
92°
90°
88°
60°
58°
56°
54°
52°
50°
49°
Churchill
Brochet
Lynn Lake
Leaf Rapids
Gillam
Nelson House
Thompson
Sherridon
Flin Flon
Wabowden
The Pas
Cormorant Lake
Cedar Lake
Grand Rapids
Norway House
Island Lake
Lake Winnipeg
Berens River
Swan River
Gypsumville
Winnipegosis
Dauphin
Hodgson
Russell
McCreary
Gimli
Pine Falls
Shoal Lake
Neepawa
Portage la Prairie
Selkirk
Brandon
Winnipeg
Virden
Steinbach
Carberry
Killarney
Morris
Delorme
Meadow
Emerson
Sprague
LEGEND
MNPC MONITORING LOCATIONS
SO_2 EMITTERS
Province of Manitoba
Surveys and Mapping Branch
MANITOBA
Scale 1 : 5 000 000
Kilometres 20 0 100 Kilometres
Cartography by: Surveys and Mapping Branch, Manitoba 1980
© Province of Manitoba 1980

APPENDIX B

DATA SUMMARY - M.N.P.C. NETWORK - 1980 - 1983

APPENDIX B

DATA SUMMARY - M.N.P.C. NETWORK - 1980 - 1983

LOCATION	1980*	1981	1982	1983
Island Lake				
Min. pH	4.34	3.02	4.00	4.09
Max. pH	5.00	6.73	7.00	6.58
Mean pH	4.79	4.47	4.42	5.06
Avg. SO_4 (mg/l)	0.69	1.61	1.52	1.27
Avg. NO_3 (mg/l)	1.12	0.68	0.70	0.81
Wet SO_4 deposition (kg/ha/yr)	N/A	7.63	8.65	7.66
Norway House				
Min. pH	5.61	3.40	4.79	4.61
Max. pH	7.50	7.28	5.85	6.13
Mean pH	6.08	4.64	4.97	5.16
Avg. SO_4 (mg/l)	0.60	1.65	1.09	1.29
Avg. NO_3 (mg/l)	0.86	1.01	1.88	1.29
Wet SO_4 (kg/ha/yr)	N/A	8.45	7.15	8.18

* 1980 data represents only 14 events for Island Lake and 9 events for Norway House respectively.

APPENDIX C

DATA - DAILY BASIS - M.W.P.C. NETWORK - 1983

PRECIPITATION DATA == NORWAY HOUSE == JAN. TO DEC. 1983

STN	COL_DATE	STD_PPT	E_TYPE	E_CHAR	X_MAT	PH	H+	SP_COND	ACIDITY	SULFATE	T_NIT_N	AMMONIA_N	CALCIUM	MAGNESIUM	SODIUM	CHLORIDE	POTASSIUM	ALKALINITY	VOLUME	LAB_NO	ION_BAL
7524	83/01/04	.	6	.	.	4.97	10.63	10.70	3.04	.80	.23	.250	.15	.025	.04	.50	.04	.	94.3	423	7.19
7524	83/01/06	.	6	.	.	4.75	17.64	13.80	2.98	.70	.44	.120	.29	.070	.09	.50	.10	.	83.3	424	6.29
7524	83/01/19	.	6	.	.	4.84	14.34	15.40	3.37	.90	.69	.230	.70	.120	.04	.15	.03	.	71.4	1411	.
7524	83/01/28	.	6	.	.	4.63	23.26	18.90	3.21	1.40	.46	.280	.20	.025	.04	.10	.03	.	199.9	2025	.
7524	83/02/07	.	6	.	.	.	.	24.70	.	1.70	.42	.120	.33	.055	.06	.25	.03	.	35.2	3012	.
7524	83/02/12	.	6	.	.	4.68	20.73	.	2.93	1.20	.48	.130	.22	.050	.11	.25	.05	.	64.7	3013	12.81
7524	83/02/19	.	6	.	.	.	.	.	.	.	.44	.160	.60	.110	.05	.	.	.	12.2	3420	.
7524	83/02/21	.	5	.	.	5.24	5.71	7.01	1.66	.60	.17	.160	.16	.040	.02	.10	.02	.	150.2	3839	4.16
7524	83/03/07	.	5	.	23	4.61	24.35	14.90	3.41	1.60	.13	.120	.11	.010	.03	.10	.03	.	600.4	4681	4.67
7524	83/03/13	.	5	.	.	5.01	9.69	6.85	2.89	.30	.15	.100	.09	.010	.01	.10	.01	.	468.9	4684	10.00
7524	83/03/24	.	6	.	.	5.08	8.25	11.50	2.70	1.60	.37	.550	.35	.075	.03	< .10	.03	.	227.5	5474	7.96
7524	83/04/12	.	6	.	.	6.05	.88	.	2.02	1.10	.19	.170	.64	.125	.08	.40	.04	.	65.4	6613	11.22
7524	83/04/27	.	6	.	.	5.85	1.40	.	4.89	1.10	.16	.250	.51	.115	.10	.10	.04	.	268.1	7579	23.22
7524	83/05/10	40.0	3	.	.	.	.	.	.	1.70	.25	.690	.77	.180	.04	.10	.16	.	1295.9	9082	.
7524	83/05/13	102.0	6	.	.	.	.	.	.	.90	.11	.140	.28	.075	.04	.10	.05	.	395.5	9084	.
7524	83/05/18	7.6	3	.	.	.	.	.	.	1.00	.16	.290	.23	.060	.03	.25	.06	.	277.7	9652	.
7524	83/05/21	21.7	3	.	.	.	.	.	.	1.00	.15	.290	.23	.060	.03	.20	.06	.	548.1	9654	.
7524	83/05/23	.	5	.	.	.	.	.	.	1.60	.05	.150	.21	.055	.05	.20	.05	.	60.9	9655	.
7524	83/06/13	5.6	3	.	24	.	.	.	.	2.20	.38	.870	.75	.160	.11	.15	.12	.	164.8	11829	22.03
7524	83/06/19	8.0	3	.	.	.	.	.	.	1.40	.29	.440	.41	.090	.05	.30	.21	.	206.3	12521	6.88
7524	83/06/25	.	3	.	.	.	.	.	.	1.70	.25	.310	.31	.065	.06	.10	.19	.	331.3	12801	5.22
7524	83/07/03	.	3	.	.	.	.	.	. <	.20	.03 <	.020	.10	.010	.02	.10	.02	.	374.7	13307	2.79
7524	83/07/09	9.8	3	.	.	4.95	11.13	.	3.64	1.70	.38	.320	.50	.085	.05	.10	.12	.	270.0	14018	4.34
7524	83/07/15	12.0	3	.	.	5.65	2.22	.	8.17	2.50	.13	.320	1.14	.195	.29	< .10	.55	.	269.0	143406	32.11
7524	83/07/17	.	3	.	.	6.10	.79	.	1.73	1.80	.26	.560	.37	.075	.07	.10	.11	.	1344.1	14351	9.62
7524	83/11/04	.	3	.	.	6.13	.74	.	1.76	1.00	.13	.080	.66	.135	.08	.10	.13	.	108.1	24623	27.07
7524	83/11/12	.	6	.	.	5.38	4.14	.	2.10	.20	.20	.150	.20	.040	.05 <	.10	.08	.	166.9	25928	20.73
7524	83/11/17	.	6	.	.	4.84	14.34	.	2.42	1.00	.35	.360	.10	.015	.04 <	.10	.03	.	255.4	25929	.24
7524	83/11/20	.	6	.	23	5.67	2.12	.	1.94 <	.20	.05	.050	.08	.040	.12	.20	.05	.	243.5	25930	18.61
7524	83/12/11	.	6	.	.	5.29	5.09	.	2.35	.30	.08	.090	.06	.015	.03	.10	.02	.	211.8	26769	8.67

PRECIPITATION DATA == ISLAND LAKE == JAN TO DEC 1983

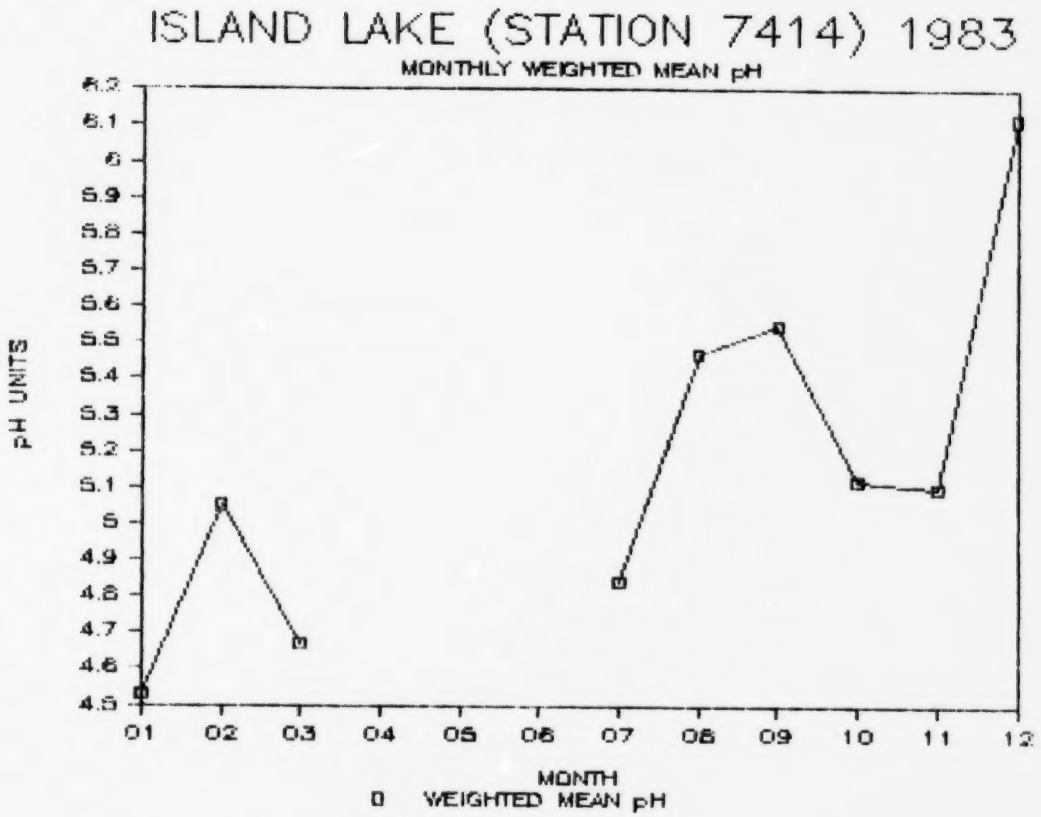
STN	COL_DATE	STD_PPT	E_TYPE	E_CHAR	X_MAT	PH	H+	SP_COND	ACIDITY	SULFATE	T_NIT_N	AMMONIA_N	CALCIUM	MAGNESIUM	SODIUM	CHLORIDE	POTASSIUM	ALKALINITY	VOLUME	LAB_NO	ION_BAL
7414	83/01/07	.	6	.	.	4.93	11.66	9.98	2.27	.50	.23	.180	.12	.025	.05 <	.10	.04	.	173.1	481	.
7414	83/01/10	.	6	.	.	5.09	8.06	14.20	2.95	2.30	.28	.330	.72	.105	.	.25	.	.	74.2	1469	.
7414	83/01/24	.	5	.	.	4.09	80.64	65.30	7.56	1.80	.51	.340	.10	.010	.08	.15	.06	.	106.9	1470	30.62
7414	83/01/30	.	6	.	.	4.67	21.21	15.60	2.78	.90	.44	.120	.20	.025	.08	.15	.06	.	94.3	2027	.
7414	83/02/13	.	6	.	.	5.14	7.19	3.20	2.51	1.10	.32	.310	.33	.045	.37	.80	.26	.	191.8	3272	2.87
7414	83/02/23	.	6	.	.	4.98	10.39	7.94	1.87	.50	.15	.110	.07	.010	.09	.15	.07	.	201.5	3977	5.50
7414	83/03/07	.	5	.	.	4.50	31.37	28.20	3.20	3.40	.44	.310	.51	.090	.45	.60	.38	.	383.5	4224	1.41
7414	83/03/09	.	6	.	.	.	.	23.70	.	2.00	.18	.110	.07	.010	.05 <	.10	.02	.	39.7	4746	.
7414	83/03/14	.	6	.	.	5.13	7.35	4.91	1.94	.20	.08	.050	.05	.010	.03 <	.10	.01	.	281.8	4747	10.98
7414	83/03/26	.	6	.	.	4.66	21.70	20.00	4.01	1.80	.50	.630	.14	.030	.06	.15	.03	.	118.4	5837	1.44
7414	83/04/12	.	6	.	.	5.30	4.97	.	1.88	.70	.13	.100	.38	.080	.06	.20	.02	.	125.1	6712	16.10
7414	83/04/26	1.8	3	.	.	5.80	1.57	.	1.00	3.90	.41	.	.	.	.	.15	.	.	46.6	7726	.
7414	83/04/28	.	6	.	.	5.35	4.43	.	1.67	.90	.19	.520	.31	.055	.05	.10	.04	.	278.6	7727	29.75
7414	83/05/12	.	5	.	.	.	.	.	.	3.30	.35	.450	.98	.165	.51	.40	.07	.	95.5	9085	6.15
7414	83/05/15	.	6	.	.	.	.	.	.	2.30	.17	.290	.19	.035	.12	.15	.07	.	235.2	9086	23.09
7414	83/05/18	.	5	.	.	.	.	.	.	2.60	.24	.660	.45	.085	.21	.40	.16	.	53.7	9650	.
7414	83/05/22	15.2	3	.	.	.	.	.	.	2.20	.27	.180	1.40	.270	.13	.20	.11	.	279.9	9651	.
7414	83/05/28	5.0	3	.	.	.	.	.	.	4.20	.70	.210	.74	.165	.63	1.00	.38	.	24.9	10193	25.53
7414	83/05/30	1.0	3	.	.	.	.	.	.	3.60	.45	.630	1.02	.210	.07	.10	.07	.	108.3	10192	3.63
7414	83/06/13	10.0	3	.	.	.	.	.	.	3.30	.28	.550	.47	.095	.12	.15	.13	.	276.8	11830	8.87
7414	83/06/14	2.2	3	.	.	.	.	.	.	3.60	.32	.700	1.00	.270	.36	.80	.37	.	44.3	12230	10.11
7414	83/06/15	4.0	3	.	.	.	.	.	.	.60	.02	.010	.10	.040	.02 <	.10	.03	.	116.2	12231	22.26
7414	83/06/20	6.8	3	.	23	.	.	.	.	5.90	.52	.200	2.00	.485	.64	1.40	1.20	.	182.1	12802	3.23
7414	83/06/23	.	3	.	.	.	.	.	.	.20	.04	.020	.08	.025	.05 <	.10	.02	.	283.3	12803	1.67
7414	83/06/26	15.0	3	.	.	.	.	.	.	.60	.07	.040	.14	.020	.06 <	.10	.02	.	79.3	12804	16.27
7414	83/07/04	24.0	3	.	.	.	.	.	.	.20	.04	.030	.18	.025	.03	.10	.02	.	276.4	13306	20.81
7414	83/07/07	12.6	3	.	.	5.00	9.92	.	3.79	.90	.15	.180	8.48	2.880	.87 <	.10	.51	.	285.9	14084	4.87
7414	83/07/08	15.4	3	.	.	4.75	17.64	.	3.95	1.00	.13	.110	4.99	1.230	2.61 <	.10	1.02	.	280.2	14083	3.63
7414	83/07/12	16.4	3	.	.	4.95	11.13	.	3.37	1.10	.21	.220	3.99	1.650	2.61 <	.10	1.02	.	227.6	14085	5.92
7414	83/07/17	2.4	3	.	.	.	.	.	.	4.40	.54	.670	1.24	.245	1.30	1.50	.41	.	39.8	14807	.
7414	83/07/23	9.0	3	.	.	6.00	.99	.	1.11	.40	.06	.002	.34	.075	.21 <	.10	.07	.	179.9	15132	39.08
7414	83/07/25	6.4	3	.	.	4.15	70.23	.	7.59	3.50 <	.01	.003	.	.	. <	.10	.	.	78.1	15133	.
7414	83/07/27	.	3	.	.	6.45	.35	. <	1.00	1.80	.36	.680	.	.	.	.20	.	.	73.3	16343	.
7414	83/08/10	10.4	3	.	.	5.28	5.21	.	1.80	1.10	.12	.100	.37	.085	.04	.20	.02	.	177.9	17232	3.87
7414	83/08/13	5.0	3	.	.	6.56	.27	.	2.78	1.90	.44	.470	1.70	.365	.07	.20	.19	.	105.7	17233	34.36
7414	83/08/18	.	3	.	.	6.22	.60	.	1.51	.50	.10	.020	.	.	.	.40	.	.	48.3	19108	.
7414	83/08/20	16.2	3	.	.	5.62	2.38	.	1.81	.70	.14	.160	.33	.080 <	.02	.10	.04	.	287.4	19109	17.24
7414	83/08/22	5.4	3	.	.	5.18	6.55	.	2.10	1.40	.17	.090	.55	.095	.17	.30	.16	.	90.0	19661	9.17
7414	83/08/26	12.3	3	.	.	5.43	3.69	.	1.94	.80	.17	.270	.21	.060 <	.02	.10	.02	.	280.0	19660	11.50
7414	83/09/04	.	3	.	.	6.58	.26	.	2.02	1.40	.16	.440	.94	.180	.02 <	.10	.13	.	808.1	20475	38.50
7414	83/09/11	.	3	.	.	5.33	4.64	.	1.86	.70	.14	.110	.25	.040	.02 <	.10	.03	.	560.7	20476	2.75
7414	83/09/19	.	3	.	.	5.40	3.95	.	1.91	1.50	.15	.320	.24	.065	.02 <	.10	.05	.	867.8	21762	.95
7414	83/09/23	.	3	.	.	5.52	3.00	.	1.59	.40	.02	.002	.12	.015	.05 <	.10	.02	.	380.5	21765	1.88
7414	83/09/29	2.4	3	.	.	.	.	.	.	9.30	1.00	1.600	1.90	.375	.25	.35	.22	.	25.4	22344	.
7414	83/10/06	.	3	.	.	5.13	7.35	.	2.91	.70	.12 <	.002	.45	.080	.05	.10	.03	.	124.7	22345	20.70
7414	83/10/12	.	5	.	.	5.37	4.23	.	1.94	.60	.09	.150	.11	.020 <	.02 <	.10	.01	.	990.3	22970	3.34
7414	83/10/17	.	5	.	.	.	.	.	.	2.20	.19	.010	.73	.110	.07	.15	.	.	26.9	22972	.
7414	83/10/22	3.1	3	.	.	4.25	55.79	.	6.13	3.40	.91	.800	.60	.105	.10	.30	.	.	52.9	23346	.
7414	83/10/24	2.8	3	.	.	4.77	16.85	.	3.06	3.60	.61	1.200	.57	.090	.34	.30	.20	.	70.6	23347	11.06
7414	83/11/08	.	5	.	.	5.45	3.52	.	1.49	.50	.09	.120	.08	.010	.04 <	.10	.03	.	560.7	25401	.55

PRECIPITATION DATA == ISLAND LAKE == JAN TO DEC 1983

STN	COL_DATE	STD_PPT	E_TYPE	E_CHAR	X_MAT	PH	H+	SP_COND	ACIDITY	SULFATE	T_NIT_N	AMMONIA_N	CALCIUM	MAGNESIUM	SODIUM	CHLORIDE	POTASSIUM	ALKALINITY	VOLUME	LAB_NO	ION_BAL
7414	83/11/09	.	6	.	.	4.52	29.96	.	3.12	1.20	.43	.210	.13	.020	.04	.10	.01	.	116.2	25612	2.94
7414	83/11/14	.	6	.	.	5.12	7.53	.	1.64	.20	.21	.070	.13	.020	.05 <	.10	.03	.	161.1	25403	3.62
7414	83/11/20	.	5	.	.	4.88	13.08	.	2.68	.	.	.	.	.	.	.	.	.	32.4	25613	.
7414	83/11/22	.	6	.	.	4.91	12.21	.	2.23	.90	.06	.050	.08	.035	.27	.50	.06	.	221.9	25614	1.60
7414	83/11/24	.	6	.	.	5.42	3.77	.	1.45 <	.20	.05	.040	.05	.050	.50	.80	.02	.	280.1	25931	7.93
7414	83/11/25	.	6	.	.	5.09	8.06	.	1.94 <	.20	.08	.040	.03	.020	.10	.20	.01	.	144.1	25932	9.27
7414	83/12/15	.	6	.	.	.	.	.	.	.50	.12	.030	.23	.055	.05	.30	.02	.	27.3	27041	.
7414	83/12/26	.	6	.	.	6.12	.75	.	1.32	.30	.03	.010	.30	.095	.	.15	.	.	70.6	27411	.

APPENDIX D

MEAN pH VS MONTH (GRAPHIC) M.N.P.C. NETWORK - 1983


ISLAND LAKE (STATION 7414) 1983
MONTHLY WEIGHTED MEAN pH
pH UNITS
6.2
6.1
6
5.9
5.8
5.7
5.6
5.5
5.4
5.3
5.2
5.1
5
4.9
4.8
4.7
4.6
4.5
01
02
03
04
05
06
07
08
09
10
11
12
MONTH
0 WEIGHTED MEAN pH

NORWAY HOUSE (STATION 7524) 1983